A New Multiobjective Evolutionary Algorithm Forenvironmental/Economic Power Dispatch

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Summary

In this paper, a new multiobjective evolutionary algorithm for environmental/economic power dispatch (EED) optimization problem is presented. The EED problem is formulated as a nonlinear constrained multiobjective optimization problem with both equality and inequality constraints. A new nondominated sorting genetic algorithm (NSGA) based approach is proposed to handle the problem as a true multiobjective optimization problem with competing and noncommensurable objectives. The proposed approach employs a diversity-preserving technique to overcome the premature convergence and search bias problems and produce a well-distributed Pareto-optimal set of nondominated solutions. A hierarchical clustering technique is also imposed to provide the decision maker with a representative and manageable Pareto-optimal set. Several optimization runs of the proposed approach are carried out on a standard IEEE test system. The results demonstrate the capabilities of the proposed NSGA based approach to generate the true Pareto-optimal set of nondominated solutions of the multiobjective EED problem in one single run. Simulation results with the proposed approach have been compared to those reported in the literature. The comparison shows the superiority of the proposed NSGA based approach and confirms its potential to solve the multiobjective EED problem